In the Claims:

1. (Original) A method of etching a multi-layer film, comprising:

etching a plurality of layers according to etching parameters;

determining a plurality of optical characteristics each associated with one of said plurality of layers and determined during said etching of said associated one of said plurality of layers; and

determining dynamic etch progressions each based on one of said plurality of optical characteristics that is associated with a particular one of said plurality of layers undergoing said etching.

2. (Original) The method as recited in Claim 1 further comprising comparing said optical characteristics to detect differences therein and dynamically adjusting said etching parameters according to said differences.

3. (Original) The method as recited in Claim 1 wherein at least two of said plurality of optical characteristics are substantially similar.

4. (Original) The method as recited in Claim 1 further comprising determining a plurality of refractive indices each associated with one of said plurality of layers, wherein each of said dynamic etch progressions is further based on one of said plurality of refractive indices that is associated with said particular one of said plurality of layers undergoing said etching.

5. (Original) The method as recited in Claim 1 wherein said determining said dynamic etch progressions is further based on an elapsed etch time.

6. (Original) The method as recited in Claim 1 wherein said etching includes one selected from the group consisting of:

dry plasma etching;

chemical-vapor-deposition;

sputter deposition;

thermal deposition;

evaporation; and

physical vapor transport.

7. (Original) The method as recited in Claim 1 wherein said plurality of layers includes at least three layers.

8. (Original) The method as recited in Claim 1 wherein at least one of said plurality of layers comprises one selected from the group consisting of:

fluorosilicate glass;

undoped silicon glass;

phosphosilicate glass; and

silicon nitride.

9. (Original) The method as recited in Claim 1 wherein said determining said plurality of optical characteristics includes collecting interference signals reflected from said particular one of said plurality of layers undergoing said etching.

10. (Original) The method as recited in Claim 9 wherein said determining said plurality of optical characteristics includes analyzing said interference signals to determine a frequency of said associated one of said plurality of layers.

11. (Original) The method as recited in Claim 10 wherein said analyzing includes performing a Fast Fourier Transform.

12. (Original) The method as recited in Claim 1 wherein said etching removes portions of said plurality of layers.

13. (Original) A method of manufacturing a microelectronic device, comprising:

providing a substrate having a first layer located on a surface thereof and a second layer located on said first layer;

determining a first etch rate by identifying a first optical characteristic of said first layer by interferometry;

etching to a first target etch depth based on said first etch rate;

determining a second etch rate by identifying a second optical characteristic of said second layer by interferometry; and

etching to a second target etch depth based on said second etch rate.

14. (Original) The method as recited in Claim 13 wherein said etching to said first target etch depth continues until said second optical characteristic is identified, at which time said etching to said second target etch depth begins.

15. (Original) The method as recited in Claim 13 wherein said first target etch depth is further based on a first refractive index of said first layer and wherein said second target etch depth is further based on a second refractive index of said second layer.

16. (Original) The method as recited in Claim 13 wherein said first target etch depth is further based on a first elapsed etch time and wherein said second target etch depth is further based on a second elapsed etch time.

17. (Original) The method as recited in Claim 13 wherein at least one of said etching to said first and second target etch depths includes one selected from the group consisting of:

dry plasma etching;

chemical-vapor-deposition;

sputter deposition;

thermal deposition;

evaporation; and

physical vapor transport.

18. (Original) The method as recited in Claim 13 wherein at least one of said first and second layers comprises one selected from the group consisting of:

fluorosilicate glass;

undoped silicon glass;

phosphosilicate glass; and

silicon nitride.

19. (Original) The method as recited in Claim 13 wherein said identifying said first optical characteristic includes collecting first interference signals reflected from said first layer during said etching to said first target etch depth and wherein said identifying said second optical characteristic includes collecting second interference signals reflected from said second layer during said etching to said second target etch depth.

20. (Original) The method as recited in Claim 19 wherein said first optical characteristic is a first frequency determined by analyzing said first interference signals and said second optical characteristic is a second frequency determined by analyzing said second interference signals.

21. (Original) The method as recited in Claim 20 wherein at least one of said analyzing said first and second interference signals includes performing a Fast Fourier Transform.

22. (Original) An etching system, comprising:

means for controlling irradiation of an etching section of a target film, said target film including a plurality of layers having varying optical characteristics;

means for detecting optical signals reflected from a surface of an exposed one of a plurality of layers in said etching section;

means for analyzing said optical signals to determine a frequency of said exposed one of said plurality of layers; and

means for detecting a change in said frequency, wherein said controlling means are configured to dynamically adapt to said change to modify parameters of said irradiation.

23. (New) A method of manufacturing a microelectronic device comprising:

providing a substrate with a first optical characteristic and a second optical characteristic located on a surface of said substrate;

determining a first etch rate by identifying the first optical characteristic by interferometry;

etching to a first target etch depth based on said first etch rate;

determining a second etch rate by identifying the second optical characteristic by interferometry; and

etching to a second target etch depth based on said second etch rate.

24. (New) The method of claim 23 wherein said etching to said first target etch depth continues until said second optical characteristic is identified, at which time said etching to said second target etch depth begins.

25. (New) The method of claim 23 wherein said first target etch depth is further based on a first refractive index of said layer and wherein said second target etch depth is further based on a second refractive index of said layer.